



Partner Reported Opportunities (PROs)  
For Reducing Methane Emissions

Compressors/Engines ☐  
Dehydrators ☐  
Pipelines ☐  
Pneumatics/Controls ☐  
Tanks ☐  
Valves ☒  
Wells ☐  
Other ☐

# Use YALE® Closures for ESD Testing

## Applicable sector(s):

☐ Production ☒ Processing ☒ Transmission and Distribution

Partners reporting this PRO: Northern Natural Gas

Other related PROs: Redesign Blowdown System and Alter ESD Practices

## Technology/Practice Overview

### Description

Department of Transportation regulations require that emergency shut down (ESD) systems at gas compression stations to be fully tested on an annual basis. One common practice is to activate the entire system, which discharges very large volumes of gas to the atmosphere. A DOT acceptable alternative is to test each individual dump valve with the discharge stack blind flanged. This greatly reduces gas emissions, but has higher labor costs associated with installing and removing a blind flange on each ESD valve.

One partner reports using YALE® closures to make the individual ESD valve testing alternative cost effective, saving the gas emissions from a total station dump. The YALE® closure is a screwed-on pipe cap with a built in needle valve that bleeds the gas pressure off the ESD valve stack for safely removing the YALE® device.

### Principal Benefits

Reducing methane emissions was:

☒ The primary benefit of the project ☐ An associated benefit of the project

### Operating Requirements

The ESD valve must have a vent stack with a threaded end to receive the YALE® closure cap.

### Applicability

This technology can be used on all ESD valves.

## Methane Savings

1,800 Mcf/yr

## Costs

Capital Costs (including installation)

☐ <\$1,000 ☒ \$1,000-\$10,000 ☐ >\$10,000

Operating and Maintenance Costs  
(Annual)

☐ <\$100 ☒ \$100-\$1,000 ☐ >\$1,000

Payback (Years)

☐ 0-1 ☒ 1-3 ☐ 3-10 ☐ >10

## Methane Emission Reductions

The methane emission savings may be estimated by subtracting the volume of gas contained in the blocked in ESD stack at line pressure from the ESD valve relief rate when cycled open and closed. For an 8-inch ESD valve with a three-foot stack, the open relief rate is about 400 Mcf per minute on a 500-psig system, and the volume of gas in the closed stack is about 40 scf. Retrofitting Ten ESD valves at a typical compression station would save about 1,800 Mcf/yr.

## Economic Analysis

### Basis for Costs and Savings

Methane emission savings of 1,800 Mcf/yr are based on typical compression station with 8 compressors, and having 10 eight-inch ESD valves. The test is assumed to be conducted at a time when the station pressure is at 500 psig. Each valve is tested once per year using YALE® closures as an alternative to an annual total station dump, cycling all ten valves open and closed in one minute.

### Discussion

The primary considerations for the reporting partner's installation of YALE® closures was to save operating labor required to install blind flanges on each ESD valve stack as an alternative to a total station dump. However, for operators currently performing annual total station dump tests, the gas savings alone would justify installation costs of modifying the ESD valve stack to receive YALE® closures and the cost of the YALE® closure devices, ranging from \$785 to \$1600 for 8-inch to 12-inch sizes, not installed.